

WHAT IS CLAIMED IS:

1. A radio base station system permitting path division multiple connection of a plurality of mobile terminal devices, comprising:

5        a synchronization window setting unit setting a synchronization window having a predetermined temporal length with a center positioned at a timing of reception of a signal transmitted from each mobile terminal device;

10        a reception disallowing unit disallowing subsequent reception of said signal if a timing of said subsequent reception of said signal is external to said set synchronization window; and

15        a transmission timing control unit controlling timings of signal transmission for respective ones of said plurality of mobile terminal devices having path division multiple connection to a specific time slot, to allow said plurality of mobile terminal devices to have their respective synchronization windows spaced from each other, as appropriate, within said specific time slot.

2. The system of claim 1, wherein said transmission timing control unit includes:

5        a first control unit controlling said timings of signal transmission to increase a difference in time between said timings of signal transmission for respective ones of said plurality of mobile terminal devices having said path division multiple connection, when said plurality of mobile terminal devices have their respective synchronization windows with a reduced interval therebetween; and

10        a second control unit controlling said timings of signal transmission to decrease a difference in time between said timings of signal transmission for respective ones of said plurality of mobile terminal devices having said path division multiple connection, when said plurality of mobile terminal devices have their respective synchronization windows with an increased interval therebetween.

3. The system of claim 1, wherein said transmission timing control unit includes a third control unit at least partially canceling said path division multiple connection to said specific time slot when at least two said mobile terminal devices having said path division multiple connection have their respective synchronization windows overlapping, after said transmission timing control unit controls said timings of transmission.

4. The system of claim 3, wherein said third control unit includes a first connection unit connecting to a different time slot of the radio base station system any of said plurality of mobile terminal devices having said path division multiple connection.

5. The system of claim 3, wherein said third control unit includes a second connection unit connecting to a time slot of a different radio base station system any of said plurality of mobile terminal devices having said path division multiple connection.

6. The system of claim 1, wherein said transmission timing control unit includes a fourth control unit excluding from said synchronization window of each of at least two said mobile terminal devices having said path division multiple connection an overlap of said at least two synchronization windows when said at least two mobile terminal devices have their respective synchronization windows overlapping, after said transmission timing control unit controls said timings of transmission.

5. The system of claim 1, further comprising a synchronization window width control unit controlling widths of said synchronization windows of respective ones of said plurality of mobile terminal devices having said path division multiple connection to said specific time slot, to allow said synchronization windows to be spaced from each other, as appropriate, within said specific time slot.

8. The system of claim 7, wherein said synchronization window

width control unit includes a fifth control unit reducing a width of said synchronization window of said mobile terminal device transmitting a signal received at a timing constant over a predetermined period of time.

9. The system of claim 8, wherein said synchronization window control unit includes a sixth control unit increasing a width of said synchronization window when a reception error is introduced with said mobile terminal device having the width of said synchronization window reduced.

5 10. The system of claim 7, wherein said synchronization window width control unit includes a seventh control unit reducing widths of said synchronization windows of respective ones of said mobile terminal devices having said path division multiple connection to said specific time slot, if a number of said mobile terminal devices having said path division multiple connection to said specific time slot is increased.

5 11. A method of controlling a synchronization window in a radio base station system permitting path division multiple connection of a plurality of mobile terminal devices, comprising the steps of:

5 setting a synchronization window having a predetermined temporal length with a center positioned at a timing of reception of a signal transmitted from each mobile terminal device;

disallowing subsequent reception of said signal if a timing of said subsequent reception of said signal is external to said set synchronization window; and

10 controlling timings of signal transmission for respective ones of said plurality of mobile terminal devices having path division multiple connection to a specific time slot, to allow said plurality of mobile terminal devices to have their respective synchronization windows spaced from each other, as appropriate, within said specific time slot.

12. The method of claim 11, wherein the step of controlling

includes the steps of :

controlling said timings of signal transmission to increase a difference in time between said timings of signal transmission for respective ones of said plurality of mobile terminal devices having said path division multiple connection, when said plurality of mobile terminal devices have their respective synchronization windows with a reduced interval therebetween; and

controlling said timings of signal transmission to decrease a difference in time between said timings of signal transmission for respective ones of said plurality of mobile terminal devices having said path division multiple connection, when said plurality of mobile terminal devices have their respective synchronization windows with an increased interval therebetween.

13. The method of claim 11, wherein the step of controlling includes the step of at least partially canceling said path division multiple connection to said specific time slot when at least two said mobile terminal devices having said path division multiple connection have their respective synchronization windows overlapping, after said step of controlling said timings of transmission.

14. The method of claim 13, wherein the step of canceling said path division multiple connection includes the step of connecting to a different time slot of the radio base station system any of said plurality of mobile terminal devices having said path division multiple connection.

15. The method of claim 13, wherein the step of canceling said path division multiple connection includes the step of connecting to a time slot of a different radio base station system any of said plurality of mobile terminal devices having said path division multiple connection.

16. The method of claim 11, wherein the step of controlling includes the step of excluding from said synchronization window of each of

5 at least two said mobile terminal devices having said path division multiple connection an overlap of said at least two synchronization windows when said at least two mobile terminal devices have their respective synchronization windows overlapping, after the step of controlling said timings of transmission.

5 17. The method of claim 11, further comprising the step of controlling widths of said synchronization windows of respective ones of said plurality of mobile terminal devices having said path division multiple connection to said specific time slot, to allow said synchronization windows to be spaced from each other, as appropriate, within said specific time slot.

18. The method of claim 17, wherein the step of controlling the widths includes the step of reducing a width of said synchronization window of said mobile terminal device transmitting a signal received at a timing constant over a predetermined period of time.

19. The method of claim 18, wherein the step of controlling the widths includes the step of increasing a width of said synchronization window when a reception error is introduced with said mobile terminal device having the width of said synchronization window reduced.

5 20. The method of claim 17, wherein the step of controlling the widths includes the step of reducing widths of said synchronization windows of respective ones of said mobile terminal devices having said path division multiple connection to said specific time slot, if a number of said mobile terminal devices having said path division multiple connection to said specific time slot is increased.

21. A program used to control a synchronization window in a radio base station system permitting path division multiple connection of a plurality of mobile terminal devices, the program causing a computer to execute the steps of:

5                   setting a synchronization window having a predetermined temporal length with a center positioned at a timing of reception of a signal transmitted from each mobile terminal device;

10                  disallowing subsequent reception of said signal if a timing of said subsequent reception of said signal is external to said set synchronization window; and

15                  controlling timings of signal transmission for respective ones of said plurality of mobile terminal devices having path division multiple connection to a specific time slot, to allow said plurality of mobile terminal devices to have their respective synchronization windows spaced from each other, as appropriate, within said specific time slot.

22. The program of claim 21, wherein the step of controlling includes the steps of :

5                  controlling said timings of signal transmission to increase a difference in time between said timings of signal transmission for respective ones of said plurality of mobile terminal devices having said path division multiple connection, when said plurality of mobile terminal devices have their respective synchronization windows with a reduced interval therebetween; and

10                  controlling said timings of signal transmission to decrease a difference in time between said timings of signal transmission for respective ones of said plurality of mobile terminal devices having said path division multiple connection, when said plurality of mobile terminal devices have their respective synchronization windows with an increased interval therebetween.

23. The program of claim 21, wherein the step of controlling includes the step of at least partially canceling said path division multiple connection to said specific time slot when at least two said mobile terminal devices having said path division multiple connection have their respective synchronization windows overlapping, after said step of controlling said timings of transmission.

24. The program of claim 23, wherein the step of canceling said path division multiple connection includes the step of connecting to a different time slot of the radio base station system any of said plurality of mobile terminal devices having said path division multiple connection

25. The program of claim 23, wherein the step of canceling said path division multiple connection includes the step of connecting to a time slot of a different radio base station system any of said plurality of mobile terminal devices having said path division multiple connection.

26. The program of claim 21, wherein the step of controlling includes the step of excluding from said synchronization window of each of at least two said mobile terminal devices having said path division multiple connection an overlap of said at least two synchronization windows when said at least two mobile terminal devices have their respective synchronization windows overlapping, after the step of controlling said 5 timings of transmission.

27. The program of claim 21, further causing the computer to execute the step of controlling widths of said synchronization windows of respective ones of said plurality of mobile terminal devices having said path division multiple connection to said specific time slot, to allow said 5 synchronization windows to be spaced from each other, as appropriate, within said specific time slot.

28. The program of claim 27, wherein the step of controlling the widths includes the step of reducing a width of said synchronization window of said mobile terminal device transmitting a signal received at a timing constant over a predetermined period of time.

29. The program of claim 28, wherein the step of controlling the widths includes the step of increasing a width of said synchronization window when a reception error is introduced with said mobile terminal

device having the width of said synchronization window reduced.

30. The program of claim 27, wherein the step of controlling the widths includes the step of reducing widths of said synchronization windows of respective ones of said mobile terminal devices having said path division multiple connection to said specific time slot, if a number of said mobile terminal devices having said path division multiple connection to said specific time slot is increased.